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ABSTRACT

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EFFECT OF A VISUAL PROMPT ON CHANGES IN ANTECEDENTS AND CONSEQUENTS OF TEACHING BEHAVIOR

By David E. Wolfe, University of the Pacific

Abstract

The purpose of this study was to examine the use of a visual prompt placed within an actual music teaching situation to effect changes in the frequency of teacher antecedents (spoken questions and statements), the quality of those antecedents (appropriate and inappropriate questions), and the frequency of teacher consequents (spoken approvals). Undergraduate music therapy students participated as teachers in providing music instruction on the guitar, recorder, or keyboard to small groups of handicapped children. The music instruction occurred on a weekly basis for a six-week period of time within instructional groups comprised of from three to six participants. The student instructors were randomly assigned to one of two groups, and its corresponding experimental conditions: Group I = A (Baseline) B (Antecedent Prompt) C (Consequent Prompt) A Baseline) D (Both Prompts); Group II = A (Baseline) C (Consequent Prompt) B (Antecedent Prompt) D (Both Prompts) A (Baseline). This behavioral design was used to assess the effect of the independent variable (visual prompt) on teacher verbalizations. Throughout the experimental conditions, a randomly selected 3-minute segment was videotaped for subsequent analysis. These tapes were reviewed by two independent observers, and the recorded frequencies of antecedents, consequences, and complete teaching units were converted to rate data. Results of the study suggest that the use of a visual prompt to effect changes in particular kinds of teacher verbal behavior was effective with student music therapy trainees.

Through systematic efforts by researchers in various areas of education and therapy, procedures are currently being identified which can enhance the teaching/therapy environment. Data are emerging that describe instructional models that can and do make a difference in student/client attentiveness, attitudes and achievement. One such model delineates instruction into teaching units(Becker, Engelmann, and Thomas, 1971). A teaching unit consists of a three-part process that includes (1) a teacher verbal antecedent, (2) a student response, and (3) a teacher verbal consequent. Teaching units have been examined in elementary music classrooms (Rosenthal, 1981)., used in music teacher training programs (Jellison & Wolfe, 1987), been observed in high school choral rehearsals (Yarbrough & Price, 1981), and have been found to result in musical performance gains and high student attitude ratings in symphonic band rehearsals (Price, 1983).

The final part of the three-part teaching model, consequent of teacher-student interactions, has been extensively examined in the music therapy and music education research literature. The use of reinforcement in the classroom, rehearsal, or music therapy situation has resulted in greater student/client on-task behaviors when the instructor/therapist has used more approving than disapproving consequents (Kuhn, 1975, Greer, 1980; Madsen & Alley, 1979). In an investigation by Thurman (1978), data suggest that a higher ratio of approval to disapproval within music settings may be not only more effective in terms of student attentiveness, but also more efficient regarding rehearsal time. Other studies have indicated that students require knowledge and feedback of their responses in order to maximize learning (Welch, 1985; Codding, 1987). A few studies have examined the use of specific kinds of positive verbal consequents. These studies have supported using descriptive reinforcement following student responses. Praise seems more likely to be effective when it is descriptive rather than global (general) in context (Fuego, Saudargas & Bushell, 1975; Horton, 1975).

Regardless of the convincing evidence of the efficacy of the use of positive consequents within varying teaching situations, teachers and therapists, especially untrained ones, often do not extend approving feedback to student responses when students are engaged in appropriate music participation. Numerous studies confirm that education and therapy majors untrained in reinforcement strategies neither recognize the need for nor exhibit positive feedback in the rehearsal, therapy or classroom settings (Duke, 1986, Jellison & Wolfe, 1987; Madsen & Alley, 1979; Madsen & Duke, 1985; Price, 1983; Yarbrough & Price, 1981).

Antecedents, those questions and directives which comprise the first part of the three-part teaching unit and provide opportunities for student responses, have received some attention in the research literature. Educational studies have suggested that the frequency of questions a teacher asks is related to student learning (Brophy & Evertson, 1976), with higher rates of questioning being associated with higher student achievement. Increased use of antecedents promotes an increase in appropriate teacher-student interactions which then result in more time spent in actual teaching (Good & Brophy, 1974).

Recent research in music has demonstrated that providing students with opportunities to respond to teacher questions and directives seems highly important to the perception of effective classroom instruction, and would seem to further engage the student in participation (Wolfe & Jellison, in press). Yet actual observations of undergraduate nonmusic and music student-teachers/therapists indicate that they ask questions and give directives with much greater frequency than they provide positive feedback (Duke, 1986; Madsen & Duke, 1987), even after training in the use of reinforcement strategies (Jellison & Wolfe, 1987). Since a high frequency of questions and directives do not appear

to ensure completion of teaching units, Jellison and Wolfe (1987) suggest that future research on antecedents, as components within a teaching unit, should focus on the quality (i.e., brevity and clarity) of those antecedents.

Based on the current literature, it would seem important that student-teachers/therapists learn not only to discriminate and employ components of effective teaching units, but more specifically to increase the appropriate use of antecedents, and general and descriptive verbal consequents. Therefore, the purpose of this study was to examine the use of a visual prompt placed within an actual teaching environment to effect changes in the frequency of teacher antecedents (spoken questions and statements), the quality of those antecedents (appropriate and inappropriate questions), and the frequency of teacher consequents (spoken approvals). Measurements were recorded on the following teacher categories: antecedents (appropriate questions, inappropriate questions, and statements), consequents (general and descriptive approvals), and complete teaching units.

Method

Design and Dependent Variables

Six dependent variables were observed across five experimental conditions (Baseline, Antecedent Prompt, Consequent Prompt, No Prompt [return to Baseline], Both Prompts) using a behavioral design. The six variables were categorized within three teaching component areas. Definitions of the categories are listed below:

Verbal Antecedent

Teacher question or statement (directive) that specifies an academic and/or social task for student(s) that is followed by a response wait time (minimum one second). Verbal antecedents may be in the form of an appropriate question ("What is the name of this note?"), an inappropriate question ("Can you tell me the name of this note?") or a statement ("Tell me the name of this note."). Preliminary examination of antecedents by Jellison and Wolfe (1987) has suggested that questions like, "Can anyone tell me the composer of this piece?", or "Can you come to the board?" often result in hesitation or no response from students and require the teacher to ask an additional question (e.g. "Class, who is the composer of this piece?", or state an additional directive (e.g. "Billy, come to the board."). Stowitschek, Stowitschek, Hendrickson, & Day (1984) have suggested that teachers/therapists working with handicapped students state questions as clearly and concisely as possible, ask one question at a time, and avoid rewording of the original question. Since students do not typically respond to questions beginning with the words, "can," "will," or "would" and questions of this type require additional questioning or rewording from the teacher, these particular kinds of questions have been defined as "inappropriate" for this study.

Verbal Consequent

Spoken word(s), phrase(s), and sentence(s) that occur immediately following a correct student response. Consequents may be in the form of a general approval (spoken words or phrases that do not include or describe the specific behavior being praised, e.g., "Good job."), or descriptive approval (words or phrases that include or describe the specific behavior being praised, e.g. "Billy, I like the way you played that legato phrase.")

Approval Teaching Unit

A sequence of teacher-student-teacher behaviors consisting of the following components: 1) teacher question (inappropriate or appropriate) or statement, 2) student(s) response, and 3) teacher verbal approval (general or descriptive). A complete teaching unit would consist of all three of the preceding components.

Procedures

Eight undergraduate music therapy students attending a small, private university in northern California participated as teachers in providing music instruction on the guitar, recorder, or keyboard to small groups of handicapped children. The music instruction occurred on a weekly basis (after normal school hours) for a six-week period of time during the spring academic semester, and took place within the music therapy facilities on the university campus. Participants were comprised of students from special education programs within both city and county school districts, and included students labeled as mildly to severely retarded, autistic, cerebral palsied, emotionally disturbed, and/or learning disabled. Students' ages ranged from 7 to 14, and instructional groups were comprised of from three to six students, formed on the basis of instrument preference and teacher assignment. The weekly sessions were 45 minutes in duration.

The teachers for these instructional groups were eight undergraduate music therapy majors with varying academic standing within the music therapy program. Student instructors included one freshman, and one transfer student with no previous music therapy training, two sophomores were currently enrolled in a course dealing with music therapy techniques for children, and four seniors all with previous music therapy training. These teachers were assigned to particular groups of students based on their desire to teach a particular instrument and their availability during designated instructional hours.

The eight student instructors were randomly assigned to one of the following groups and its corresponding conditions:

	Week2	Week3	Week4	Week5
	A	B	C	A/D
Grp I	Baseline	Consequent Prompt (G&D)	Antecedent Prompt (Q&S)	No Prompt/ Both Prompts
	A	**C**	**B**	**D/A**
Grp II	Baseline	Antecedent Prompt (Q&S)	Consequent Prompt (G&D)	Both Prompts/ No Prompt

Experimental Conditions

During week 2 of the initial Baseline phase (A), the instructors were given no specific guidance concerning their teaching, and the classroom contained no visual prompts. However, the day preceding the B and C experimental conditions, each student-teacher arranged an individual meeting with the program advisor. During the Consequent Prompt condition (B), the student teacher was told/reminded of the distinction between general and descriptive (G & D) verbal approval reinforcement, and made aware of the importance of using descriptive verbal approvals. Both spoken and written examples of general and descriptive approvals were

presented to the student instructor. The teacher was then shown a visual prompt (smile face with the words, "Be descriptive" contained within a cartoon balloon), and told it would be placed in the classroom the following day as a reminder to exhibit the appropriate teacher behavior. This same procedure occurred the day prior to the Antecedent Prompt condition (c) for each group of teachers, but during this individual session, the teacher was told/reminded of the distinction between questions and statements (Q & S), appropriate from inappropriate questions, and given examples (spoken and written) of each kind of antecedent. The teacher was then shown a smile face with the words, "Ask questions and give directives," and again told it would be placed in the classroom the following day. These "training" sessions lasted approximately five minutes in duration. During the D Phase, both prompts were placed in the teaching environment, and during the final No Prompt condition (A=return to Baseline), both prompts were removed. Throughout the experimental conditions (teaching sessions), a randomly selected 3-minute segment (beginning, middle, or ending) was videotaped for subsequent analysis across weeks 2-5 of the music instruction.

Results

Videotapes of teaching sessions were reviewed by two independent observers and the frequency of antecedents, consequents, and complete teaching units was recorded. Numbers of antecedents and consequents were then converted to rate data by dividing the total number in each category by the number of videotaped instructional minutes (3). Observer reliability across the experimental conditions was computed for 50% of the videotaped sessions. Data were computed for each of the six variables by dividing the number of agreements by the total number of agreements plus disagreements. Percentage of agreement for appropriate questions=82%, inappropriate questions=87%; statements=91%, general approvals=95%, descriptive approvals=87%, and complete teaching units=88%. The range for observer reliability across dependent measures was 82% to 95%.

An examination of the data in Table 1 shows that for Group 1 during Baseline and the visual prompting of antecedents (Q & S), the use of appropriate questions went from a rate of 4.7 to 4.0 per minute, inappropriate questions decreased from a rate of 5.7 to 2.0 per minute, and statements increased from 8.3 to 14.3 per minute. Consequents for Group I resulted in a baseline rate from general approvals of 4.3 to 3.3 per minute during the use of a visual prompt (G & D). Descriptive approvals increased from 3.7 to 8.0 per minute during the same experimental condition.

Table 1 shows that for Group II during Baseline and the visual prompting of antecedents (Q&S), the use of appropriate questions decreased from a rate of 3.6 to 2.7 per minute., inappropriate questions changed from a rate of 5.3 to 5.0 per minute, and statements increased from a rate of 6.3 to 9.7 per minute. Consequents for Group II resulted in a baseline rate for general approvals of 5.3 to 3.0 per minute during the use of a visual prompt (G&D), and descriptive approvals increased from 3.3 to 6.3 per minute during the same experimental condition.

When comparing the antecedent prompt condition (Q&S) to the No Prompt phase (return to Baseline) for Group I, figures in all categories of antecedents (appropriate and inappropriate questions and statements) decreased. However, when comparing the consequent prompt condition (G&D) to No Prompt, general approvals went from 3.3 to 7.3 and descriptive approvals went from 8.0 to 3.0 per minute. When figures from the final Both Prompts condition are compared to the initial Baseline, appropriate questions decreased (4.7 to 0.0), inappropriate questions decreased (5.7 to 2.0), statements increased (8.3 to 14.0), general approvals increased (4.3 to 7.3) and descriptive approvals decreased slightly (3.7 to 3.3).

Comparing the antecedent prompt condition (Q&S) to the No Prompt phase for Group II, figures for appropriate and inappropriate questions decreased, while the rate of statements increased. Comparing the consequent prompt condition (G&D) to No Prompt, general approvals went from 3.0 to 8.3, and descriptive approvals from 6.3 to 5.3 per minute. When figures from the final Both Prompts condition are compared to the initial Baseline, appropriate questions increased (3.6 to 5.3), inappropriate questions decreased (5.3 to .33), statements increased (6.3 to 7.0), general approvals increased (5.3 to 6.7) and descriptive approvals increased (3.3 to 6.0).

TABLE 1

Group Rate Per Minute of Verbal Antecedents and Consequents Across Experimental Conditions

Group I	Conditions				
Variables	Baseline	Prompt G&D	Prompt Q&S	No Prompt	Both Prompts
Antecedents					
Appropriate Questions	4.7	4.7	4.0	1.0	0.0
Inappropriate Questions	5.7	4.3	2.0	1.7	2.0
Statements	8.3	5.7	14.3	13.0	14.0
Consequents					
General Approvals	4.3	3.3	6.3	7.3	7.3
Descriptive Approvals	3.7	8.0	4.3	3.0	3.3
Group II	**Conditions**				
Variables	Baseline	Prompt G&D	Prompt Q&S	No Prompt	Both Prompts
Antecedents					
Appropriate Questions	3.6	3.0	2.7	2.0	5.3
Inappropriate Questions	5.3	2.3	5.0	2.0	.33
Statements	6.3	10.7	9.7	14.3	7.0
Consequents					
General Approvals	5.3	3.0	5.3	8.3	6.7
Descriptive Approvals	3.3	6.3	4.0	5.3	6.0

Table 2 contains the frequency and percentage of complete teaching units for questions and statements across the experimental conditions. When total figures for both groups are combined and averaged, a higher percentage of complete teaching units occur under appropriate questions (57%) and statements (42%) compared to inappropriate questions (25%).

TABLE 2

Frequency and Percentage of Complete Teaching Cycles for Questions and Statements Across Experimental Conditions

Group I	Conditions				
Variables	Baseline	Prompt G&D	Prompt Q&S	No Prompt	Both Prompts	Total
Appropriate Questions	7 (50%)	12 (86%)	5 (42%)	2 (67%)	0 (0%)	26 (60%)
Inappropriate Questions	2 (12%)	5 (38%)	2 (33%)	0 (0%)	1 (17%)	10(21%)
Statements	3 (12%)	4 (24%)	19 (44%)	18 (46%)	13 (31%)	57 (34%)
Group II	**Conditions**				
Variables	Baseline	Prompt G&D	Prompt Q&S	No Prompt	Both Prompts	Total
Appropriate Questions	3 (27%)	6 (67%)	3 (38%)	2 (33%)	13 (81%)	27 (54%)
Inappropriate Questions	4 (25%)	1 (14%)	4 (27%)	4 (67%)	0 (0%)	13 (29%)
Statements	7 (37%)	6 (50%)	15 (52%)	24 (56%)	12 (57%)	74 (51%)

Discussion

Caution should be used in making inferences from this small group study due to various uncontrolled variables frequently encountered when conducting applied behavioral research. However, results of this study would suggest that the use of a visual prompt to elicit particular kinds of teacher verbal behavior was effective with this small number of student music therapy trainees. When the visual prompt was employed to encourage elicitation of antecedents, the date resulted in a slight decrease in appropriate questions, a decrease in the use of inappropriate questions and an increase in spoken statements. With more frequent use of antecedent statements, it may be expected that a decrease in questioning would naturally occur.

When a visual prompt was placed in the teaching environment to elicit changes in verbal consequents, especially descriptive approvals, data from both groups showed a decrease in the use of general and an increase in descriptive verbal approvals. When the consequent visual prompt was replaced with the antecedent prompt (Q&S) or all prompts removed from the teaching environment (return to baseline), general approvals increased and descriptive approvals decreased in all cases except one. During the final session under the Both Prompts condition, the use of general and descriptive verbal approvals increased in use for both groups compared to the initial Baseline rate.

Realizing that the kind or reinforcement schedule (i.e., continuous, fixed, or variable) can significantly influence the occurrence of complete teaching units, these particular student trainees exhibited a greater percentage of complete teaching units when asking appropriate questions and/or giving directives (statements) than when asking inappropriate questions. Since these music therapy student trainees were working with handicapped children at a beginner level of instruction, it could be expected that a more continuous schedule of reinforcement would be employed within the teaching environment, hopefully resulting in the observance of more complete teaching units. It would therefore seem important that student trainees be encouraged to use antecedents in their teaching which would increase the probability of resulting in complete teaching units, that is, use more appropriate questions and statements as antecedents to student responses.

Finally, it seems important to teacher/therapist training programs that any procedure that may make the teaching/learning process more efficient and effective, especially within an actual teaching/therapy situation, should be employed. Simply providing a visual prompt to assist student-therapists in transferring verbal teaching skills practiced within a simulated classroom setting to an actual teaching/therapy situation may be beneficial. Future research should continue to examine the quality of antecedents as they relate to complete teaching units. Systematic observations of the rate of occurrence of appropriate questions and directives and general and descriptive approvals may be valuable in providing performance criteria for teacher verbal behavior.

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